

WHAT IS CLAIMED IS:

1. A method for analyzing a temporal expression, the method comprising:  
  
parsing the temporal expression to form a hierarchical tree, each node of said hierarchical tree containing a subexpression of the temporal expression;  
  
propagating a sampling event to each node of said hierarchical tree according to at least one *Sampling* rule; and  
  
determining each transition from each node of said hierarchical tree to a successor node according to at least one transition *Step* rule to analyze the temporal expression.
2. The method of claim 1, further comprising:  
  
repeating said determining until a plurality of transitions have been determined to form a state machine.
3. The method of claim 2, wherein said state machine is a deterministic state machine.
4. The method of claim 3, further comprising:  
  
evaluating the temporal expression with said deterministic state machine.

5. The method of claim 2, wherein said state machine evaluates a temporal expression for design verification of a DUT (device under test).
6. The method of claim 2, wherein said state machine evaluates temporal expressions for a concurrent, dynamic system.
7. The method of claim 6, wherein said concurrent dynamic system is selected from the group consisting of a telephonic system, a switching network, and an embedded control software program.
8. The method of claim 2, wherein the temporal expression includes at least one expression containing at least one repeated subexpression and said state machine is constructed by representing said at least one expression as a finite structure having an unbounded number of counters for representing said at least one repeated sub-expression.
9. The method of claim 1, wherein said propagating of said sampling event further comprises normalizing said hierarchical tree.
10. The method of claim 9, wherein normalizing said hierarchical tree includes removing at least one anomalous expression, wherein an anomalous expression is an expression equivalent to epsilon or empty.

11. The method of claim 10, wherein removing said at least one anomalous expression is performed recursively.

12. The method of claim 1, wherein the temporal expression is constructed in a temporal language and parsing the temporal expression further comprises translating said temporal language into a plurality of functions, each function featuring an operator selected from a finite set of operators.

13. The method of claim 1, wherein said hierarchical tree has a root node and at least one leaf, and propagating said sampling event is performed iteratively starting from said root node.

14. The method of claim 13, wherein propagating said sampling event further comprises creating a new node for attaching said sampling event to said node, wherein said node is a successor node to said new node.

15. The method of claim 14, wherein creating said new node is performed if said sampling event is repeated at least once.

16. The method of claim 1, wherein propagating said sampling event further comprises reducing said hierarchical tree.

17. The method of claim 16, wherein said hierarchical tree is reduced according to at least one rule, said rule being applied to said hierarchical tree recursively.